E-Learning Innovation Theory Model and Commons Dilemma in Saudi Arabia

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Author's contribution

This work was carried out in collaboration between all authors. All authors read and approved the final manuscript.

Review Article

ABSTRACT

The foundations of government policy related to e-learning, especially to the extent they were theoretically informed and innovative, were influenced by two theories: diffusion of innovation and commons dilemma. Implementation of e-learning technology systems is still evolving in the Kingdom of Saudi Arabia. Even though in the world at large long-distance learning has existed for some time, it is relatively new to Saudi Arabia. E-learning in Saudi Arabia addresses issues of greater population growth and the distribution of education to remote areas, including having a sufficient number of educational facilities through satellite locations. This Paper presents innovations in transmission of an alternative learning system currently under consideration and the effect on the citizens' level of education. With regard to the theory of diffusion of innovation, the government of Saudi Arabia should have a policy-making process with criteria to determine what constitutes a higher achievement level of a student and a successful learning outcome.

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1. INTRODUCTION

The progress from traditional to modern learning has been enriched with increased flexibility, interactivity and delivery methods for materials and has allowed more access [1]. The progress of education from the old or traditional modes of delivery through technology began with the innovation of radio and how it has affected and/or shaped the world, followed by television, multimedia, Internet, web-based resources, and now the era of computer-mediated communication, and finally to campus portals interconnected to form the global Educational Consortium [2]. Bernard [3] stated, "Distance education was once regarded simply as a reasonable alternative to campus-based education, primarily for students who had restricted access to campuses because of geography, time constraints, disabilities or other circumstances".

Innovation can be categorized into one of three types:

(a) Product innovation, such as new technology;
(b) Process innovation: demonstrating new ways to implement services; or
(c) Policy innovation: the type that is related to a new way of approaching policies [4]. In the case of an e-learning educational system, the innovation is of the third type: A new idea or innovation obtained through new policy creation and/or practice. The development of a long-distance learning project in Saudi Arabia's remote areas would ensure the fulfillment of educational needs of the citizens residing in those areas, giving them equal opportunities other citizens of the kingdom enjoy. The innovations here refer to learning via satellite as part of the solution. The policy process responds to many geographical issues as well as considering whether the proposed innovation provides exceptional benefits to all individuals or organizations [5,6].

Rogers [6] defined an innovation as "an idea, practice, or object perceived as new by an individual or other unit of adoption". Distance education innovation in Saudi Arabia is similar to any other innovation. The distinctiveness of e-learning can influence the speed of adoption. Additionally, numerous studies have examined the reasons for resistance to e-learning, and several results have been identified. Innovation, according to [7], is utilized "in terms of how it is perceived by prospective adopters. The focus is on understanding perceptions rather than on questioning the validity of the perceptions. The more positive the perceptions of the innovation, the more likely the chances are of having a favorable adoption decision" [7]. Murphrey and Dooley [8] stated that "how people perceive and react to these technologies is far more important than the technical obstacles in influencing implementation and use" [8]. The distinctive stages that Rogers [6] described in his innovation decision process theory are the knowledge stage, the persuasion stage, the decision stage, the implementation stage and the confirmation stage.

2. THE KNOWLEDGE STAGE

The innovation decision-making process begins with knowledge. In this stage, the person understands the existence of innovation and searches for information regarding innovation. "What," "why," and "how" are the serious questions in the knowledge stage [6]. The innovation-decision process is fundamentally an information processing and information-seeking action in which the person is aggravated to decrease hesitantly about the relative of disadvantages and advantages of improvement [6]. Is exposed to an innovation's extension

and increase some accepting of how it functions. Types of knowledge sort from how-to use an innovation properly, awareness about the innovation and principles-knowledge dealing with the functioning principles underlying how the innovation works. Predispositions such as selective exposure and selective perception may influence an individual's behavior toward announcement messages concerning an innovation and the results that such communications are likely to have. Throughout this stage, the person decides which innovation to adopt and why and how it works [6].

3. THE PERSUASION STAGE

The persuasion stage occurs when the person has a positive or negative attitude about the innovation, but "the formation of a favorable or unfavorable attitude toward an innovation does not always lead directly or indirectly to an adoption or rejection" [6]. This person forms his attitude after he gains knowledge about the innovation, so persuasion follows the knowledge stage in the innovation process.

Additionally, [6] stated that as the knowledge phase is about knowing, the persuasion phase is more emotional. Therefore, the person is getting additional feelings about the innovation in the persuasion phase. The rate of adoption of the innovation by others affects the individual's views and attitudes concerning the innovation. According to Sherry [9], "While information about a new innovation is usually available from outside experts and scientific evaluations, teachers usually seek it from trusted friends and colleagues whose subjective opinions of a new innovation are most convincing"

4. THE DECISION STAGE

In the decision stage, the person prefers to accept or refuse the innovation. At the same time, according to Rogers [6], acceptance refers to the whole utilization of an innovation as the most excellent path of action obtainable, while refusal means not to accept an innovation. On the other hand, refusal is possible in each stage of the innovation process. Rogers articulated two types of rejection: active rejection in which a person attempts an innovation and feels positive about accepting it, but afterward, chooses not to accept it. A discontinuance decision, which is to reject an innovation after adopting it previously, may be regarded as an active rejection. In a passive rejection, the person is unwilling to adopt the innovation in any way. The implementation phase follows the decision stage.

5. THE IMPLEMENTATION STAGE

In the implementation phase, the innovation is related to practice. However, according to Rogers [6], the innovation carries some extent of ambiguity involved in diffusion. Ambiguity about the results of the innovation may be troublesome at this phase. Therefore, the implementer may need technical help from others to decrease the level of ambiguity about the result. Furthermore, the innovation-decision process will finish, since the innovation loses its unique value as the separate uniqueness of the original idea departs [6]. Reinvention usually occurs at the implementation phase, so it is a significant part of the implementation stage. Reinvention, according to Rogers [6], is the level of an innovation that is altered or adapted by a user in the process. Also, Rogers [6] clarified the distinction between invention and innovation-whereas invention is the progression by which a new idea is exposed, the adoption of an innovation is the process of utilizing the accessible idea. Additionally, Rogers [6] argued that the more reinvention exists, the more rapidly an innovation is accepted.

Technology is the most common area for potential change in the form of innovation and application; thus technologies are most likely open to reinvention.

6. THE CONFIRMATION STAGE

Once innovation has been established, the adopter seeks an external opinion in support for his or her decision regarding an innovation. According to Rogers [6], if the person faces conflicting opinion about an innovation, then his or her decision might be reversed. Conversely, if the individual finds support for the decision, adoption is more likely. Thus, the attitudes of others become more critical in the confirmation phase. In this phase, consideration for what kind of support is available for adoption of innovation plays a role. Discontinuance occurs during this innovation stage in two ways. First, there is rejection of innovation for the purpose of replacing it, known as replacement discontinuance. The second form is disenchantment discontinuance, where the person later rejects it due to the fact that he or she is displeased with the innovation's performance. An additional reason for a discontinuance decision is perhaps that the innovation does not meet the requirements of the person. As a result, it does not offer a tangible benefit, which is considered to be the first characteristic of innovation and influences the level of adoption [6].

7. INNOVATION MODEL

This model examines the influence several variables have on the reduction of the education issues by e-learning policy enactment and their impact on citizens. This policy window shown in Fig. 1 represents policy results from enactment of government as a response to higher education concerns. In addition, the influence of government and innovation policy represent their relationship to the research questions concerning the policy practices in an e-learning educational system and the effect to citizens geographically and economically as well as the population growth, in which the government creates law, establishes policies and implements policy recommendations that relate to the citizen education system.

First, in this model, is the independent variable which is accessibility. The focus on computer-based education in the model was to make the existing practices more accessible and efficient. The goal was to introduce technology to augment the face-to-face curriculum, resulting in an amplification of the existing traditional classroom.

As the technology developed, the model expanded to include distance education as an alternative to no educational opportunities at all for certain demographics, such as individuals living in rural or remote locations [1]. Additionally, this model can be used as a transformer that enables government changes in the way that learning takes place. This model illustrates the accessibility of courses without the requirement of having to physically attend a classroom and allows students to establish their own schedules and to work at their own pace. The accessibility has been helpful to the practical applications in the diffusion of innovation and a better understanding of behavior change [6]. The practical applications include the variation in rates of behavior change and can be applied to the spread of the Internet [6]. However, diffusion of innovation to Accessibility adoption and diffusion of distance education within the education profession. The results of this variable could amplify the diffusion of distance education.
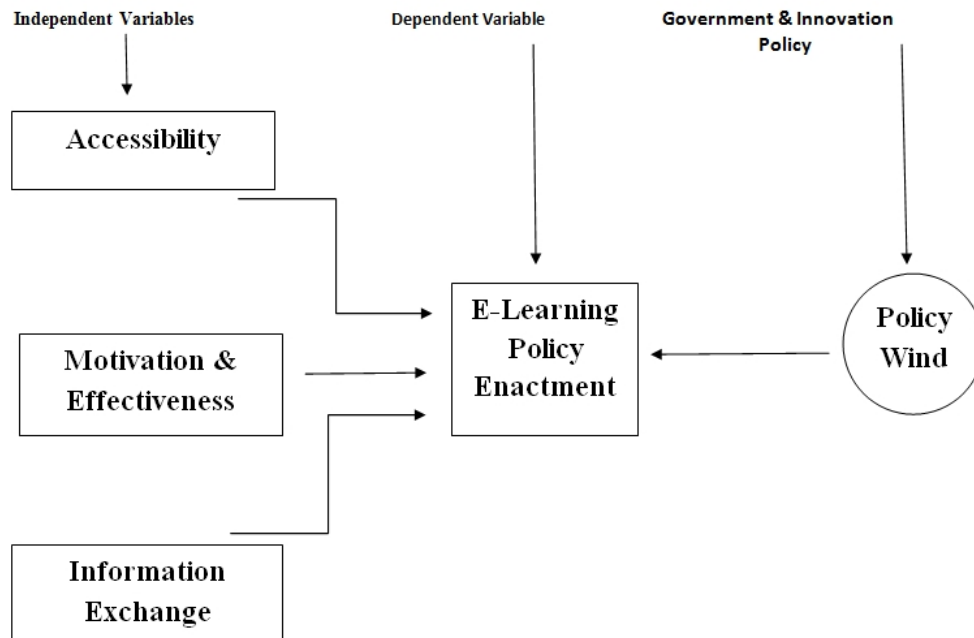
Fig. 1. Innovation model

Second, another independent variable is motivation and effectiveness. Politicians and government appointees may help to serve remote areas by creating a snowball effect with rapid and dramatic change by motivation to increase the learning process and the acceptance of the student and teacher learning method The function of this element (effectiveness) in its contribution towards being grouped with motivation can be established by having learners, complete:

(a) Mutual goals, for instance reaching agreement on specific solutions to problems or arriving at team-generated solutions;
(b) Mutual rewards, for example individually assigned points counting toward a criterion-referenced final grade, points which only help;
(c) Structured tasks, such as a report or complex problem with sections mutually developed by all team members; and
(d) Interdependent roles, such as group members serving alternately as discussion leaders, organizers, recorders, and spokespersons.

A study conducted by [10] focused on evaluating different computer-assisted instruction software at the King Fahd University of Petroleum and Minerals. The study employed a control group in traditional classrooms and an experimental group using computerized programs; both groups were evaluated in mathematics. Participants ranked highest a self-guided program developed by Larson, Hostetler, & Edwards [11]. This multimedia program contained quantitative and qualitative measures and featured a glossary and a user-friendly interface. The qualitative portion of the program was tested online with participants responding positively to the online experience with better motivation and performance than the control group with classroom tests. Teachers reported a slight but steady improvement in attitude toward incorporating computer and online technologies into the traditional lesson

plans. The motivation and effectiveness in this stage is receiving additional feelings about the innovation in the persuasion phase. The rate of adoption of the innovation by others affects the individual's views and attitudes concerning the innovation. The results of this variable could amplify the diffusion of distance education in distance education

The third independent variable is information exchange. Policy alternatives take the form of suggestion, for which survivability is usually reliant on the criteria of information exchange; value alignment within the policy community and consideration of restrictions such as attempts to implement and expand information and education capabilities, provide vocational training courses and certificates and provide educators' professional development to provide work opportunities and economic development. Information exchange variable have the acceptance which refers to the whole utilization of an innovation as the most excellent path of action obtainable, the results of this variable could amplify the diffusion of distance education in distance education.

If the government added distance learning as a best alternative to fill the gap, the delivery method referred to in the model is promoted as a means to cope with increasing educational and economic challenges and provide the best information change environment [12].

Olusi's [13] study compared traditional and computerized instructional program methods for mathematics instruction in an Edo State, Nigerian secondary school. The research examined pre-test and post-test scores. Findings of the study indicated that the instructional program was a positive influence on the subjects' understanding and performance in the subject area. Nevertheless, the findings indicated that the combination of online instruction with traditional instruction allowed subjects to achieve their highest proficiency for both genders.

When the policy window is released from the government regarding a given problem, a collecting of the problems, policies, and government take place for supporting the policy and adoption of the benefits increased for an e-learning educational system. Berry and Berry [5] stated that government policy windows operate as political authority and find where "unrelated political and fiscal conditions converge".

8. COMMONS DILEMMA

The commons dilemma theory was described in Hardin's [14] work, "Tragedy of the Commons." It contrasted individuals seen as being conflicted with self-serving, short-term interests, as compared with long-term investments in the group's common good. Hardin pointed out an example in which individuals share a common piece of land and serve their animals, illustrating that it is individual interest to serve many animals even if there are resulting damages to the commons, since the individuals gain all the benefits yet will also spread any loss among the group. According to Hardin [15] "Each herdsman pursues his own interest based on individually rational calculus. However if all pursue their individual interest, the result is collectively irrational one; that is, the ultimate destruction of the Commons".

The paradox is that if everyone makes his or her own decision based on selfish interests, then the commons will be damaged and the rest of the individuals will experience the consequences. Hardin concentrated on a possible solution to fix this dilemma, including privatization and policies.

Based on findings of studying this phenomenon, researchers in general [16] agree that Hardin was right in his illustration of the issues of the commons dilemma. The commons problem has application to several fields. As applied to distance learning issues, it informs such inflexible situations. The government of Saudi Arabia is moving toward fast learning development and shorter learning experiences; the development and implementation of the e-learning system in Saudi Arabia provides students with participation in different education methods other than the traditional system, which required experience, skill, and knowledge programs in order to gain high-quality interaction [16]. According to Talvitie-Siple [17], "What works within one e-learning environment may not work in another.

There is a relationship that exists between pedagogy, the audience, the content, and the environment that cannot be generalized" [18]. The flexibility of distance learning at any time and any place clearly means no education by poor management or technology [19].

Additionally, students in Saudi Arabia who are not high achievers and have limited comprehension skills most likely will not succeed and will drop out at higher rates. According to Roblyer, "it is not surprising that programs that enroll a high percentage of at-risk students are much more likely to have high dropout and failure rates" [19].

The return on investment of distance education in the Kingdom of Saudi Arabia to solve education issues for some students in remote areas group does not necessarily predict the return on the education system for other student groups in the cities or in fact in the same remote areas [20]. According to Roblyer [19], "Dropout and failure rates for virtual programs are reported to be as high as 60% to 70% in some locations".

Some distance learning students benefit from the program and resist the change, whereas other students' reaction may be aggravated by the perception of distance learning isolation due to low interaction and a lack of background knowledge, skills and experiences [21].

9. CONCLUSION

As one of the biggest educational systems in the world, online education balances between governmental and institutional interests in which each institution concomitantly cooperates and competes with the others. Distance education and the use of digital information technologies are growing rapidly throughout the world, in cities as well as in remote areas. E-learning is rapidly becoming a major method of delivering education, largely as a result of recent technological advancements [21]. Saudi Arabia is one example of a country that has enthusiastically embraced the promise of distance learning, especially in recent years. The background for this paper utilized a mixture of the framework model and government policy with a detailed theoretical focus on diffusion of innovation and the commons dilemma. The diffusion of innovation study was drawn from in particular to examine the independent variables.

COMPETING INTERESTS

Authors have declared that no competing interests exist.

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